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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,901	12/30/2005	Takashi Kikukawa		4409

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EXAMINER	
BUTCHER, BRIAN M	

ART UNIT	PAPER NUMBER
2627	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/562,901	KIKUKAWA ET AL.	
	Examiner	Art Unit	
	BRIAN BUTCHER	4113	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 7-14* is/are rejected.

7)☒ Claim(s) *5 and 6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *See Continuation Sheet*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :30 March 2006, 19 March 2008, 11 August 2008..

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: On **page 13, line 4, "at least 0.5 mW and at most 2.0 mW higher than a value of recording power"** appears to need a change to **"at least 0.5 mW higher and at most 2.0 mW higher than a value of recording power"** for the sake of clarity. Appropriate correction is required.

The disclosure is objected to because of the following informalities: On **page 13, line 28, "at least 0.1 mW and at most 0.3 mW higher than a value of reproducing power"** appears to need a change to **"at least 0.1 mW higher and at most 0.3 mW higher than a value of reproducing power"** for the sake of clarity. Appropriate correction is required.

The disclosure is objected to because of the following informalities: On **page 21, lines 8 - 21,** the description appears to be inconsistent and should be reviewed for the sake of clarity. Appropriate correction is required.

The disclosure is objected to because of the following informalities: On **page 30, line 31,** and on **page 31, line 4, "metal oxide layer 32"** appears to need a change to **"metal oxide layer 23".** Appropriate correction is required.

The disclosure is objected to because of the following informalities: On **page 32, lines 11 and 29, "Fig. 1"** appears to need a change to **"Fig. 1(a) and 1(b)"** for the sake of clarity. Appropriate correction is required.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: **Figure 9 does not include "103a" and "104a". Also, Figure 11 recites "Pw" instead of "Pr" as described in the specification.** Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory

obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 3, 4, 5, 6, 7, 10, 11, and 13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 3, 5, 7, 8 and 9 of copending Application No.10/563012. Although the conflicting claims are not identical, they are not patentably distinct from each other because both applications claim an identical optical medium structure having layers that have identical ranges of thicknesses.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following table shows the similarities between claims 1 and 8 of the copending Application No.10/563012 and claims 1 and 4 of the instant application 10/562901.

Copending Application 10/563012	Instant Application 10/562901
1.) An optical recording medium comprising: a support substrate; an optical transmitting layer; and a first dielectric layer, a noble metal oxide layer, a second dielectric layer, a light absorption layer, and a third dielectric layer, all of which are interposed, in this sequence from said optical transmitting layer, between said optical transmitting layer and said support substrate, wherein a thickness of said support substrate ranges from 0.6 mm to 2.0 mm; a thickness of said optical transmitting layer ranges from 10 μm to 200 μm; a thickness of said noble metal oxide layer ranges from 2 nm to 50 nm; a thickness of said second dielectric layer ranges from 5 nm to 100 nm; a thickness of said light absorption layer ranges from 5 nm to 100 nm; and a thickness of said third dielectric layer ranges from 10 nm to 140 nm.	1.) An optical recording medium comprising: a substrate; an optically transparent layer; a first dielectric layer; a noble metal oxide layer; a second dielectric layer; a light absorbing layer; and a third dielectric layer, said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer, wherein setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam, and setting is done as: Pwx0.1 ≤Pr≤Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam, while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train.

8.) A data recording method for recording data on said above-described optical recording medium defined in any one of claims 1 to 5, by exposing the optical-transmissive layer to a laser beam, wherein, when the wavelength of said laser beam is taken as λ and a numerical aperture of said objective lens used for focusing the laser beam is taken as NA, a record mark train including a record mark having a length of λ/4NA or less is recorded by setting λ/NA to a value of 640 nm or less.

4.) An optical recording medium according to any one of Claims 1 through 3, characterized in that said substrate is not thinner than 0.6 mm and not thicker than 2.0 mm, said optically transparent layer is not thinner than 10 μm and not thicker than 200 μm, said noble metal oxide layer is not thinner than 2 nm and not thicker than 50 nm, said second dielectric layer is not thinner than 5 nm and not thicker than 100 nm, said light absorbing layer is not thinner than 5 nm and not thicker than 100 nm, and said third dielectric layer is not thinner than 10 nm and not thicker than 140 nm.

Claims 1, 2, 3, 4, 5, 6, 10, 11, and 13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 3, 4, 5, 6, 7, 10, and 11 of copending Application No.10/565679. Although the conflicting claims are not identical, they are not patentably distinct from each other because both applications claim an identical optical medium structure with an obvious variation between a noble metal oxide layer and a noble metal nitride layer.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following table shows the similarities between claim 1, 2, 3, 6, 7, and 10 of the copending Application No.10/565679 and claim 1 and 4 of the instant application 10/562901.

Copending Application 10/565679	Instant Application 10/562901
1.) An optical recording medium comprising: a substrate; and a noble metal nitride layer provided on the substrate.	1.) An optical recording medium comprising: a substrate; an optically transparent layer; a first dielectric layer; a noble metal oxide layer; a second dielectric layer; a light absorbing layer; and a third dielectric layer, said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer, wherein setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam, and setting is done as: Pwx0.1 ≤Pr≤Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam, while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train.
2.) The optical recording medium according to claim 1, further comprising: a first dielectric layer provided on a light entrance face side of the substrate when viewed from the noble metal nitride layer; and a second dielectric layer provided on a side of the substrate opposite the light entrance face thereof when viewed from the noble metal nitride layer.	
3.) The optical recording medium according to claim 2, further comprising: a light absorption layer and a third dielectric layer, which are provided on a side of the substrate opposite the light entrance face thereof when viewed from the second dielectric layer and arranged in this sequence when viewed from the second dielectric layer.	
6.) The optical recording medium according to any one of claims 2 through 5, further comprising: a light-transmitting layer which is provided opposite to the substrate when viewed from the first dielectric layer and has the light entrance face.	4.) An optical recording medium according to any one of Claims 1 through 3, characterized in that said substrate is not thinner than 0.6 mm and not thicker than 2.0 mm, said optically transparent layer is not thinner than 10 μm and not thicker than 200 μm, said noble metal oxide layer is not thinner than 2 nm and not thicker

than 50 nm, said second dielectric layer is not thinner than 5 nm and not thicker than 100 nm, said light absorbing layer is not thinner than 5 nm and not thicker than 100 nm, and said third dielectric layer is not thinner than 10 nm and not thicker than 140 nm.

7.) The optical recording medium according to claim 6, wherein a thickness of the substrate ranges from 0.6 mm to 2.0 mm; a thickness of the light-transmitting layer ranges from 10 μm to 200 μm; a thickness of the noble metal nitride layer ranges from 2 nm to 75 nm; a thickness of the second dielectric layer ranges from 5 nm to 100 nm; a thickness of the light absorption layer ranges from 5 nm to 100 nm; and a thickness of the third dielectric layer ranges from 10 nm to 140 nm.

10.) A data recording method for recording data on the optical recording medium defined in any one of claims 1 through 7, to thus record data by irradiating a laser beam from the light entrance face, wherein, when a wavelength of the laser beam is taken as λ. and a numerical aperture of an objective lens used for focusing the laser beam is taken as NA, a train of record marks, including record marks whose lengths are λ/4NA or less, is recorded by setting λ/NA to 640 nm or less.

Claims 1, 2, 3, 4, 5, 6, 10, 11, and 13 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 2, 3, 4, 6, 9, 10, 13, 15, 17, 18, and 20 of copending Application No.10/568582. Although

the conflicting claims are not identical, they are not patentably distinct from each other because both applications claim the same optical medium structure and the same thicknesses for the substrate and the optically transparent layers

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

The following table shows the similarities between claims 1, 2, and 9 of the copending Application No.10/568582 and claims 1 and 11 of the instant application 10/562901.

Copending Application 10/568582	Instant Application 10/562901
1.) (Original) An optical recording medium comprising: a substrate, a noble-metal oxide layer provided on the substrate, a first dielectric layer provided on a light-incidence plane side when viewed from the noble-metal oxide layer and a second dielectric layer provided on the side opposite to the light-incidence plane when viewed from the noble-metal oxide player, the second dielectric layer containing ZnS or a mixture of ZnS and SiO2 as a main component, wherein the proportion of ZnS to the sum of ZnS and SiO2 is set at a value from 60 mole % to 100 mole %.	1.) An optical recording medium comprising: a substrate; an optically transparent layer; a first dielectric layer; a noble metal oxide layer; a second dielectric layer; a light absorbing layer; and a third dielectric layer, said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer, wherein setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam, and setting is done as: Pwx0.1 ≤Pr≤Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam,

while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train.

2.) (Original) An optical recording medium as described in claim 1, further comprising, on the side opposite to the light-incidence plane when viewed from the second dielectric layer, a light absorption layer and a third dielectric layer arranged in this order when viewed from the second dielectric layer.

9.) (Currently Amended) A data recording method in which data is recorded on an optical recording medium as described in any of claims 1 to 3 by irradiation with a laser beam from the light-transmitting layer side, wherein, when the wavelength of the laser beam is represented as λ and the numerical aperture of an objective lens for focusing the laser beam is represented as NA, λ/NA is set at 640 nm or below and a string of recording marks including recording marks λ/4NA or below in length is recorded.

11.) A data recording method for recording data into an optical recording medium by irradiating said optical recording medium with a laser beam from an optically transparent layer side, the optical recording medium having a substrate, an optically transparent layer, a first dielectric layer, a noble metal oxide layer, a second dielectric layer, a light absorbing layer and a third dielectric layer, said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer, said data recording method being characterized in that: setting is done so that λ/NA is not longer than 640 nm and a value of recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW when λ, designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam, while said data recording method records a recording mark train including recording marks each

having a length not larger than $\lambda/4NA$.

Claim Objections

Claims 5 and 6 are objected to under 37 CFR 1.75(c) as being in improper form because **a multiple dependent claim cannot depend from any other multiple dependent claim**. See MPEP § 608.01(n). Accordingly, the claims have not been further treated on the merits.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 - 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji et al. ("A Near-Field Recoding and Readout Technology Using a Metallic Probe in an Optical Disk"), hereinafter referenced as Fuji, in view of Hsu et al. ("Blue – Laser Readout Properties of Super Resolution Near Field Structure Disc with Inorganic Write – Once Recoding Layer"), hereinafter referenced as Hsu, in view of Van Woudenberg (United States Patent Application Publication US 2002/0126602 A1), hereinafter referenced as Van Woudenberg, and further in view of Kim et al. ("Reactive recording with rare-earth transition metal"), hereinafter referenced as Kim.

Regarding **claim 1**, Fuji discloses an optical disk for recording and reproducing information that reads on the optical recording medium claimed. First, Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light

absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on "setting is done as: Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam" because 6.5 mW times 0.5 equals 3.25 mW which is greater than 2.5 mW and 6.5 mW times 0.1 equals 0.65 mW which is less than 2.5 mW. However, Fuji fails to disclose "a substrate", "wherein setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam", and "while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train". The examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "wherein setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" and "a substrate", as taught by Hsu. In addition, the examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "setting information required for recording a recording mark train", as taught by Van Woudenberg. Furthermore, the examiner

maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train", as taught by Kim.

First, in a similar field of endeavor Hsu discloses a recording disc in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. Second, in a similar field of endeavor Van Woudenberg discloses a carrier that includes disc information data such as write power, writing speed, pulse width, and the like (page 3, paragraph [0023], lines 1—10) which reads on "while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train" with the exception of "including recording marks each having a length not larger than λ/4NA". Third, in a similar field of endeavor Kim discloses that the resolution limit for the mark

length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "including recording marks each having a length not larger than λ/4NA".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Hsu to include "a substrate" because one having ordinary skill in the art would want to use the bottom substrate to increase substrate strength (see Hsu page 2, section 2, lines 23 – 25) Also, it would have been obvious to modify the optical disk for recording and reproducing information of Fuji with the teachings of Hsu to include "wherein setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because one having ordinary skill in the art would want to use a shorter wavelength with a higher numerical aperture lens to decrease spot size and increase recording density (see Hsu page 1, paragraph 1, lines 1 – 6). In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Van Woudenberg to include "setting information required for recording a recording mark train" because one having ordinary skill in the art would want to save processing power and time (see Van Woudenberg page 3, paragraph [0023]) Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Kim to include "recording marks each having a length

not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 2**, Fuji discloses an optical disk for recording and reproducing information that reads on the optical recording medium claimed. First, Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the recording of the optical disk at a power of 6.5 mW (page 1 - 2, section 4, lines 1 - 3, and figure 1) which reads on the "recording power of a laser beam is not lower than 5.3 mW and not

higher than 11.0 mW" because 6.5 mW falls within the claimed range. However, Fuji fails to disclose "a substrate", "wherein setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam", and "while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA". The examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "wherein setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" and "a substrate", as taught by Hsu. In addition, the examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "setting information required for recording a recording mark train", as taught by Van Woudenberg. Furthermore, the examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "recording marks each having a length not larger than λ/4NA", as taught by Kim.

First, in a similar field of endeavor Hsu discloses a recording disc in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective

lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. Second, in a similar field of endeavor Van Woudenberg discloses a carrier that includes disc information data such as write power, writing speed, pulse width, and the like (page 3, paragraph [0023], lines 1—10) which reads on "while said optical recording medium includes setting information required for recording a recording mark train including recording marks each having a length not larger than λ/4NA" with the exception of "including recording marks each having a length not larger than λ/4NA". Third, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "including recording marks each having a length not larger than λ/4NA".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Hsu to include "a substrate" because one having ordinary skill in the art would want to use the bottom substrate to increase substrate strength (see Hsu page 2, section 2, lines 23 – 25) Also, it would have been obvious to modify the optical disk for recording and reproducing information of Fuji with the teachings of Hsu to include "wherein setting is done so that λ/NA is not

longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because one having ordinary skill in the art would want to use a shorter wavelength with a higher numerical aperture lens to decrease spot size and increase recording density (see Hsu page 1, paragraph 1, lines 1 – 6). In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Van Woudenberg to include "setting information required for recording a recording mark train" because one having ordinary skill in the art would want to save processing power and time (see Van Woudenberg page 3, paragraph [0023]) Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 3**, Fuji discloses an optical disk for recording and reproducing information that reads on the optical recording medium claimed. First, Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout

layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the reproducing of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on the "reproducing power of a laser beam is not lower than 1.1 mW and not higher than 3.3 mW" because 2.5 mW falls within the claimed range. However, Fuji fails to disclose "a substrate", "wherein setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam", and "while said optical recording medium includes setting information required for reproducing data from a recording mark train including recording marks each having a length not larger than λ/4NA". The examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "wherein setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a

wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" and "a substrate", as taught by Hsu. In addition, the examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "setting information required for reproducing data from a recording mark train", as taught by Van Woudenberg. Furthermore, the examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include "recording marks each having a length not larger than λ/4NA", as taught by Kim..

First, in a similar field of endeavor Hsu discloses a recording disc in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. Second, in a similar field of endeavor Van Woudenberg discloses a carrier that includes disc information data such as write power, writing speed, pulse width, and the like (page 3, paragraph [0023], lines 1—10) which reads on "while said optical recording medium includes setting information required for

reproducing data from a recording mark train including recording marks each having a length not larger than λ/4NA" with the exception of "including recording marks each having a length not larger than λ/4NA". Third, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "including recording marks each having a length not larger than λ/4NA".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Hsu to include "a substrate" because one having ordinary skill in the art would want to use the bottom substrate to increase substrate strength (see Hsu page 2, section 2, lines 23 – 25) Also, it would have been obvious to modify the optical disk for recording and reproducing information of Fuji with the teachings of Hsu to include "wherein setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of said laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because one having ordinary skill in the art would want to use a shorter wavelength with a higher numerical aperture lens to decrease spot size and increase recording density (see Hsu page 1, paragraph 1, lines 1 – 6). In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Van Woudenberg to include "setting information required for reproducing data from a recording mark train" because one having ordinary skill in the art would want to save

processing power and time (see Van Woudenberg page 3, paragraph [0023]) Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fuji et al. ("A Near-Field Recoding and Readout Technology Using a Metallic Probe in an Optical Disk"), hereinafter referenced as Fuji, in view of Hsu et al. ("Blue – Laser Readout Properties of Super Resolution Near Field Structure Disc with Inorganic Write – Once Recoding Layer"), hereinafter referenced as Hsu, in view of Van Woudenberg (United States Patent Application Publication US 2002/0126602 A1), hereinafter referenced as Van Woudenberg, in view of Kim et al. ("Reactive recording with rare-earth transition metal"), hereinafter referenced as Kim(I), and further in view or Kim et al. ("Signal Characteristics of Super – RENS Disk at Blue Laser System"), hereinafter referenced as Kim(II).

Regarding **claim 4**, Fuji, Hsu, Van Woudenberg, and Kim, the combination of hereinafter referenced as FHVWK, disclose everything claimed as applied above (see claims 1 - 3), in addition FHVWK disclose a disc structure that is composed of the claimed layer thicknesses. Specifically, Fuji discloses two protective layers (page 1,

section 2, lines 1 - 3, and figure 1) which read on "said second dielectric layer is not thinner than 5 nm and not thicker than 100 nm" and "said third dielectric layer is not thinner than 10 nm and not thicker than 140 nm" because the second dielectric layer is 40 nm (falling within the claimed range) and the third dielectric layer is 20 nm (falling within the claimed range). Also, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "said noble metal oxide layer is not thinner than 2 nm and not thicker than 100 nm" because the readout layer is 15 nm and falls within the range claimed. Furthermore, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "said light absorbing layer is not thinner than 5 nm and not thicker than 140 nm" because the recording layer is 15 nm and falls within the range claimed. In addition, Hsu a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface (page 1, section 2, lines 1 – 5) which reads on "said substrate is not thinner than 0.6 mm and not thicker than 2.0 mm" because the substrate is 0.6 mm and falls within the range claimed. However, FHVWK fail to disclose where "said optically transparent layer is not thinner than 10 μm and not thicker than 200 μm". The examiner maintains that it was well known in the art for the optical disk for recording and reproducing information disclosed in Fuji to include an optically transparent layer that is not thinner than 10 μm and not thicker than 200 μm, as taught by Kim(II).

In a similar field of endeavor Kim(II) discloses a super – RENS recording disc of a similar structure that as a 0.1 mm cover layer (page 1, paragraph 2, lines 1 -2, and

figure 1 "Cover Layer") which reads on "said optically transparent layer is not thinner than 10 μm and not thicker than 200 μm" because the cover layer is optically transparent and has a thickness of 0.1 mm (100 μm) which falls within the range claimed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the optical disk for recording and reproducing information of Fuji by specifically using the teachings in Kim(II) to include an optically transparent layer that is not thinner than 10 μm and not thicker than 200 μm because one having ordinary skill in the art would want to control the overall thickness of the optical disc.

Claims 7 - 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al. ("Blue – Laser Readout Properties of Super Resolution Near Field Structure Disc with Inorganic Write – Once Recoding Layer"), hereinafter referenced as Hsu, in view of Fuji et al. ("A Near-Field Recoding and Readout Technology Using a Metallic Probe in an Optical Disk"), hereinafter referenced as Fuji, and further in view of Kim et al. ("Reactive recording with rare-earth transition metal"), hereinafter referenced as Kim.

Regarding **claim 7**, Hsu discloses an HD – DVD testing system that reads on the optical recording/reproducing apparatus claimed. First, Hsu discloses recording a disc with an HD—DVD testing system in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is

not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface used for recording/reproduction (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. However, Hsu fails to disclose "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order", "while said optical recording/reproducing apparatus records a recording mark train including recording marks each having a length not larger than λ/4NA and reproduces data from said recording mark train", and "setting is done as: Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam". The examiner maintains that it was well known in the art for the HD – DVD testing system disclosed in Hsu to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" and "setting is done as: Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam", as taught by Fuji. Furthermore, the examiner maintains that it was well known in the art for the HD – DVD

testing system disclosed in Hsu to include "recording marks each having a length not larger than λ/4NA and for reproducing data from said recording mark train", as taught by Kim.

First, in a similar field of endeavor Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on "setting is done as $Pwx0.1 \leq Pr \leq Pwx0.5$ when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam"

because 6.5 mW times 0.5 equals 3.25 mW which is greater than 2.5 mW and 6.5 mW times 0.1 equals 0.65 mW which is less than 2.5 mW. In addition, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "said optical recording/reproducing apparatus records a recording mark train including recording marks each having a length not larger than λ/4NA and reproduces data from said recording mark train".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" because one having ordinary skill in the art would want to use this structure to eliminate the mirror layer of the structure of Hsu. Also, it would have been obvious to modify the HD – DVD testing system of Hsu by with the teachings of Fuji to include "setting is done as: $Pwx0.1 \leq Pr \leq Pwx0.5$ when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam" because one having ordinary skill in the art would want to ensure reproduction from an optical recording medium without changing/affecting data already written on the medium. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the HD – DVD testing system of Hsu by specifically using the teachings in Kim to include "recording marks each having a length

not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 8**, Hsu discloses an HD – DVD testing system that reads on the optical recording apparatus claimed. First, Hsu discloses recording a disc with an HD—DVD testing system in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface used for recording (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. However, Hsu fails to disclose "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order", "while said optical recording apparatus records a recording a recording mark train including recording marks each having a length not larger than λ/4NA", and "the recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW". The examiner maintains that it was well known in the art for the

HD – DVD testing system disclosed in Hsu to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" and "the recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW ", as taught by Fuji. Furthermore, the examiner maintains that it was well known in the art for the HD – DVD testing system disclosed in Hsu to include "recording a recording mark train including recording marks each having a length not larger than λ/4NA ", as taught by Kim.

First, in a similar field of endeavor Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from

said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on the "recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW" because a recording power of 6.5 mW falls within the range claimed. In addition, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "said optical recording apparatus records a recording mark train including recording marks each having a length not larger than λ/4NA ".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" because one having ordinary skill in the art would want to use this structure to eliminate the mirror layer of the structure of Hsu. Also, it would have been obvious to modify the HD – DVD testing system of Hsu by with the teachings of Fuji to include the "recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW" because one having ordinary skill in the art would want to ensure that data is written at a power consistently higher than that of reproduction. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the HD – DVD testing system of Hsu by specifically using

the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 9**, Hsu discloses an HD – DVD testing system that reads on the optical reproducing apparatus claimed. First, Hsu discloses reproducing a disc with an HD—DVD testing system in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface used for recording (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. However, Hsu fails to disclose "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order", "while said optical reproducing apparatus reproduces data from a recording a recording mark train including recording marks each having a length not larger than λ/4NA", and "the reproducing power of said laser beam is not lower than

1.1 mW and not higher than 3.3 mW". The examiner maintains that it was well known in the art for the HD – DVD testing system disclosed in Hsu to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" and "the reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3 mW ", as taught by Fuji. Furthermore, the examiner maintains that it was well known in the art for the HD – DVD testing system disclosed in Hsu to reproduce "data from a recording mark train including recording marks each having a length not larger than λ/4NA ", as taught by Kim.

First, in a similar field of endeavor Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed

between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on the "reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3 mW" because a reproducing power of 2.5 mW falls within the range claimed. In addition, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "said optical reproducing apparatus reproduces data from a recording mark train including recording marks each having a length not larger than λ/4NA ".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" because one having ordinary skill in the art would want to use this structure to eliminate the mirror layer of the structure of Hsu. Also, it would have been obvious to modify the HD – DVD testing system of Hsu by with the teachings of Fuji to include "reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3 mW" because one having ordinary skill in the art would want to ensure reproduction from an optical recording medium without changing/affecting data already written on the medium. Furthermore, it would have been obvious to one of ordinary skill

in the art at the time the invention was made to modify the HD – DVD testing system of Hsu by specifically using the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 10**, Hsu discloses the recording and readout testing of a super—RENS disc using an HD – DVD testing system that reads on the data recording/reproducing method claimed. First, Hsu discloses recording a disc with an HD—DVD testing system in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface used for recording/reproduction (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. However, Hsu fails to disclose "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order", "while said data recording/reproducing method

records a recording mark train including recording marks each having a length not larger than λ/4NA and reproduces data from said recording mark train", and "setting is done as Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam". The examiner maintains that it was well known in the art for the recording and readout testing of a super—RENS disc using an HD – DVD testing system disclosed in Hsu to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" and "setting is done as Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam", as taught by Fuji. Furthermore, the examiner maintains that it was well known in the art for the recording and readout testing of a super—RENS disc using an HD – DVD testing system disclosed in Hsu to include "recording marks each having a length not larger than λ/4NA and reproduces data from said recording mark train", as taught by Kim.

First, in a similar field of endeavor Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 -

4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on "setting is done as Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam" because 6.5 mW times 0.5 equals 3.25 mW which is greater than 2.5 mW and 6.5 mW times 0.1 equals 0.65 mW which is less than 2.5 mW. In addition, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "said data recording/reproducing method records a recording mark train including recording marks each having a length not larger than λ/4NA and reproduces data from said recording mark train".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the

teachings in Fuji to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" because one having ordinary skill in the art would want to use this structure to eliminate the mirror layer of the structure of Hsu. Also, it would have been obvious to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu with the teachings of Fuji to include "setting is done as Pwx0.1≤Pr≤ Pwx0.5 when Pw designates recording power of said laser beam and Pr designates reproducing power of said laser beam" because one having ordinary skill in the art would want to ensure reproduction from an optical recording medium without changing/affecting data already written on the medium. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 11,** Hsu discloses the recording and readout testing of a super—RENS disc using an HD – DVD testing system that reads on the data recording method claimed. First, Hsu discloses recording a disc with an HD—DVD testing system in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines

25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface used for recording (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. However, Hsu fails to disclose "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order", "while said data recoding method records a recording a recording mark train including recording marks each having a length not larger than λ/4NA", and the "recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW". The examiner maintains that it was well known in the art for the recording and readout testing of a super—RENS disc using an HD – DVD testing system disclosed in Hsu to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" and the "recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW ", as taught by Fuji. Furthermore, the examiner maintains that it was well known in the art for the recording and readout testing of a super—RENS disc using an HD – DVD testing system

disclosed in Hsu to include recording "a recording mark train including recording marks each having a length not larger than λ/4NA ", as taught by Kim.

First, in a similar field of endeavor Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on the "recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW" because a recording power of 6.5 mW falls within the range claimed. In addition, in a similar field of endeavor Kim discloses that the resolution limit

for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "said data recording method records a recording mark train including recording marks each having a length not larger than λ/4NA ".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" because one having ordinary skill in the art would want to use this structure to eliminate the mirror layer of the structure of Hsu. Also, it would have been obvious to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu with the teachings of Fuji to include the "recording power of said laser beam is not lower than 5.3 mW and not higher than 11.0 mW" because one having ordinary skill in the art would want to ensure that data is written at a power consistently higher than that of reproduction. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 12**, Hsu, Fuji, and Kim, the combination of hereinafter referenced as HFK, disclose everything claimed as applied above (see claim 11), in addition HFK disclose a data recording method wherein "said recording power is set to be at least 0.5 mW and at most 2.0 mW higher than a value of recording power with which a carrier/noise ratio will be substantially saturated". Specifically, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on "said recording power is set to be at least 0.5 mW and at most 2.0 mW higher than a value of recording power with which a carrier/noise ratio will be substantially saturated" because 6.5 mW plus 0.5 mW equals 7.0 mW which is greater than 5.3 mW and 6.5 mW plus 2.0 mW equals 8.5 mW which is less than 11.0 mW.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said recording power is set to be at least 0.5 mW and at most 2.0 mW higher than a value of recording power with which a carrier/noise ratio will be substantially saturated" because one having ordinary skill in the art would want to ensure that sufficient energy is delivered to the light absorbing layer (see Kim page 3, paragraph 6, lines 28 – 35).

Regarding **claim 13**, Hsu discloses the recording and readout testing of a super—RENS disc using an HD – DVD testing system that reads on the data reproducing method claimed. First, Hsu discloses reproducing a disc with an HD—DVD

testing system in which a laser light of a wavelength of 405 nm and an objective lens having a numerical aperture of 0.65 are used for recording and readout (page 2, section 2, lines 25 – 28) which reads on "setting is done so that λ/NA is not longer than 640 nm . . . when λ designates a wavelength of a laser beam and NA designates a numerical aperture of an objective lens for focusing said laser beam" because the wavelength of 405 nm divided by the numerical aperture of 0.65 equals approximately 623 nm which is less than 640 nm. In addition, Hsu discloses a UV - curing resin/dummy PC substrate that occurs at the end of a similar disc structure in order of the layers from the light incident surface used for recording (page 1, section 2, lines 1 – 4) which reads on "said substrate in this order in view from said optically transparent layer" claimed. However, Hsu fails to disclose "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order", "while said data reproducing method reproduces data from a recording a recording mark train including recording marks each having a length not larger than λ/4NA", and the "reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3 mW". The examiner maintains that it was well known in the art for the recording and readout testing of a super—RENS disc using an HD – DVD testing system disclosed in Hsu to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" and the "reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3

mW ", as taught by Fuji. Furthermore, the examiner maintains that it was well known in the art for the recording and readout testing of a super—RENS disc using an HD – DVD testing system disclosed in Hsu to reproduce "data from a recording mark train including recording marks each having a length not larger than λ/4NA ", as taught by Kim.

First, in a similar field of endeavor Fuji discloses a substrate (page 1, section 2, lines 1 - 3, and figure 1) which reads on "an optically transparent layer" claimed. Second, Fuji discloses three protective layers (page 1, section 2, lines 1 - 3, and figure 1) which read on "a first dielectric layer", "a second dielectric layer", and "a third dielectric layer" claimed. Third, Fuji discloses a readout layer made of AgOx (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a noble metal oxide layer" claimed. Fourth, Fuji discloses a recording layer made of $Ge_2Sb_2Te_5$, (page 1, section 2, lines 1 - 4, and figure 1) which reads on "a light absorbing layer" claimed. Fifth, Fuji discloses schematically a structure of layers beginning from a light incident surface as follows: Substrate, First protective layer, Readout layer, Second protective layer, Recording layer, and Third protective layer (page 1, section 2, lines 1 - 4, and figure 1). The order of layers reads on "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order in view from said optically transparent layer" where the last layer, "said substrate" is missing. Six, Fuji discloses the reproduction of the optical disk at a power of 2.5 mW (page 1 -2, section 4, lines 1 - 4, and figure 1) which reads on the "reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3 mW" because a reproducing

power of 2.5 mW falls within the range claimed. In addition, in a similar field of endeavor Kim discloses that the resolution limit for the mark length of a disc having a similar structure is λ/4NA (page 2, paragraph 4, lines 1—10) which reads on "said data reproducing method reproduces data from a recording mark train including recording marks each having a length not larger than λ/4NA ".

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said first dielectric layer, said noble metal oxide layer, said second dielectric layer, said light absorbing layer and said third dielectric layer being disposed between said optically transparent layer and said substrate in this order" because one having ordinary skill in the art would want to use this structure to eliminate the mirror layer of the structure of Hsu. Also, it would have been obvious to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by with the teachings of Fuji to include "reproducing power of said laser beam is not lower than 1.1 mW and not higher than 3.3 mW" because one having ordinary skill in the art would want to ensure reproduction from an optical recording medium without changing/affecting data already written on the medium. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Kim to include "recording marks each having a length not larger than λ/4NA" because one having

ordinary skill in the art would recognize the relationship between CNR and mark length (see Kim page 3, paragraph 5, line 1 -14, and figure 3 a).

Regarding **claim 14**, HFK disclose everything claimed as applied above (see claim 13), in addition HFK disclose a data reproducing method wherein "said reproducing power is set to be at least 0.1 mW and at most 0.3 mW higher than a value of reproducing power with which a carrier/noise ratio will be substantially saturated". Specifically, Fuji discloses the recording of the optical disk at a power of 6.5 mW and reproduction of the optical disk at a power of 2.5 mW (page 1 - 2, section 4, lines 1 - 4, and figure 1) which reads on "said reproducing power is set to be at least 0.1 mW and at most 0.3 mW higher than a value of reproducing power with which a carrier/noise ratio will be substantially saturated" because 2.5 mW plus 0.1 mW equals 2.6 mW which is not lower than 1.1 mW and 2.5 mW plus 0.3 mW equals 2.8 mW which is less than 3.3 mW.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the recording and readout testing of a super—RENS disc using an HD – DVD testing system of Hsu by specifically using the teachings in Fuji to include "said reproducing power is set to be at least 0.1 mW and at most 0.3 mW higher than a value of reproducing power with which a carrier/noise ratio will be substantially saturated" because one having ordinary skill in the art would want to ensure that the best acceptable CNR can be obtained (see Hsu page 4, section 3, lines 68 -76, and figure 8)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian M. Butcher whose telephone number is (571) 270 – 5575. The examiner can normally be reached on Monday - Friday 7:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's trainer, Jefferey F. Harold can be reached at (571) 272 – 7519. The fax phone number for the organization where this application or proceeding is assigned is (703) 872—9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305 – 4800.

BMB
August 26, 2008
/Jefferey F Harold/
Supervisory Patent Examiner, Art Unit 4113